Appl. No. 09/643,895
Amendment Dated **January 26, 2005**
Reply to Office action of October 26, 2004

PATENT

REMARKS

This Amendment is submitted in response to the Office Action of October 26, 2004 (hereinafter "the Office Action"). Upon entry of this Amendment, claims 4-18 will be canceled without prejudice, claims 1-3 are amended, and new claims 19-21 are submitted. Therefore claims 1-3 and 19-21 will be pending, including newly submitted claims 19-21.

All references to the claims, except as noted, will be made with reference to the claim list above beginning on page 3. All references to "the Office Action," except as noted, will be referencing the most recent Office Action dated October 26, 2004. Line numbers in the Office Action, except as noted, will count every printed line, except the page header, but including section headings. References to "the Application" will be made to the substitute specification submitted November 17, 2003. Explanations of prior art references are based on the undersigned's best understanding thereof. If there is any confusion or questions regarding any aspect of this Amendment, the Examiner is invited to contact the undersigned.

Status of claims

Claim 18 is under objection for being in improper dependent form. Claim 14 is under objection for various informalities. Claims 16 and 18 stand rejected under 35 U.S.C. § 112, second paragraph. Claims 1-2, 5, 7-8 and 10-11 stand rejected to under 35 U.S.C. § 102(b). Claims 3, 9, and 12-18 stand rejected to under 35 U.S.C. § 103(a).

Amendment

The specification is amended to clarify certain aspects of the invention. Specifically, the first full paragraph of page 10 is amended to specify, inter alia, that the backing register file is not accessible to the execution units. This addition is not prohibited new matter since it is otherwise supported by the disclosure. See MPEP 2163.07. Specifically, Figure 3 shows no connection between the backing register file 300 and the execution units. Furthermore, the specification as originally filed clearly completely describes all the connections and exemplary uses of the backing register file which omits explicit reference to elements *not* connected to the backing register file. Since the existing connections and functions of the backing register are thoroughly and completely described, it would have been clear that the backing register

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file is inaccessible to the execution units, and this would have been plain to any person having ordinary skill in the art upon reading the original disclosure. Furthermore, Applicants note that an application may be amended to explicitly recite an inherent function, theory or advantage without introducing prohibited new matter. See MPEP 2163.07(a).

Claim 1 is amended to removed certain unnecessary limitations. In addition, Claim 1 now specifies that the at least one register file is available to programs for temporarily storing operands and results. Claim 1 is also amended to specify that the backing register file is, "inaccessible to the at least one execution unit and, in at least one mode, is always visible outside the processor and available to programs at any privilege level" (claim 1, lines 12-13). Support for this limitation is found in the Application, page 12, lines 17-20. Furthermore, claim 1 is amended to include the phrase, "by said at least one execution unit" to further define the arbitration functionality of the bypass circuitry.

Claim 2 is amended for improved consistency with claim 1.

Claim 3 is amended to clarify the function of the connection circuit.

Claims 5 and 7-18 are canceled without prejudice.

Claims 19-21 are provided to further distinguish the invention from the prior art. Support for claim 19 is provided in page 15, lines 12-13 of the Application. Support for claim 20 is provided in page 14, lines 9-11. Support for claim 21 is provided by Figure 4 and associated text from page 13, line 19, to page 15, line 16.

No new matter has been entered by way of the amendments presented herein.

Objections

Claims 14 and 18 are under objection for improper grammar or for being in improper dependent form. As these claims have been canceled without prejudice, Applicants respectfully request that the objections be withdrawn.

Claim Rejections -- 35 U.S.C. § 112

Claims 16 and 18 stand rejected under 35 U.S.C. § 112, second paragraph, for being indefinite (Office Action, page 3, line 13). Claims 16 and 18 are canceled without prejudice, thereby obviating the rejections thereagainst.

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Claim Rejections -- 35 U.S.C. § 102(b)

Claims 1, 2, 5, 7, 8, 10, and 11 stand rejected under 35 U.S.C. § 102(b) for being anticipated by U.S. Patent 5,900,025 to Sollars (Sollars). Applicants respectfully traverse because each and every claim limitation is not disclosed by Sollars or because the rejected claim has been canceled.

As the Examiner is aware, each and every claim element must be present or inherent in Sollars for anticipation under 35 U.S.C. § 102(b). See MPEP 2131. There are numerous distinctions between the invention as claimed in claims 1, 2, 5, 7, 8, 10, and 11, and Sollars. What follows is a discussion of several differences; any one of which is sufficient to overcome the rejection under 35 U.S.C. § 102(b).

Claim 1 sets forth, inter alia, "at least one execution unit couple to the at least one register file, the at least one register file being available to programs for temporarily storing operands and results" (lines 3-4). The Office Action, page 4, line 12, states that element 20a, b of Figure 1 of Sollars reads on "at least one register file." Applicant respectfully disagrees. The element 20a, b of Figure 1 of Sollars is directed to a control register file which stores various control information relating to the operation of the processor. Specifically, Sollars states, "Primary control register file 20a comprises a plurality of control registers for performing the conventional functions of storing control and status information of executing processes . . ." (col. 5, lines 32-35). A similar functionality is stated for auxiliary control register files 20b in col. 5, lines 55-59. Since Sollars utilizes the primary and auxiliary control register files 20a, 20b for storing control and status information, they are not available to programs for temporarily storing operands and results as now required by claim 1. Therefore these control registers cannot read on the "at least one register file, the at least one register file being available to programs for temporarily storing operands and results" as now set forth in claim 1.

Claim 1 now also sets forth, inter alia, "at least one bypass circuit operatively coupled to said at least one register file and said at least one execution unit, said at least one bypass circuit capable of arbitrating access by said at least one execution unit to said at least one register file" (claim 1, lines 5-7). The Office Action points to col. 3, lines 35-58 and col. 5 lines 32-54 to show anticipation by Sollars of a bypass circuit (page 4, lines 15-18). The Office Action further states that, "because arbitration of access to the register files amongst

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threads is occurring, there is inherently some circuitry associated with the arbitration process in order for it to be carried out" (page 4, lines 18-19). Applicants agree that Sollars teaches controlling access by threads to the control registers based on privilege level, but this does not meet the recitation of claim 1 to "a bypass circuit . . . capable of arbitrating access by said at least one execution unit to said at least one register file." Sollars does not mention arbitration, but limiting access based on privilege. Furthermore, Sollars is concerned with limiting access to the control registers by various threads while claim 1 sets forth a bypass circuit for, not limiting access, but arbitrating access to the register file by the execution units. Thus, Sollars does not anticipate, teach or suggest the bypass circuit as claimed.

Claim 1 further sets forth a backing register file operatively coupled to said at least one register file, said backing register file being inaccessible to the at least one execution unit, always visible outside the processor and available to the programs at any privilege level. The Office Action identifies primary operand register file 22a shown in Figure 1 as reading on the backing register file (page 4, line 21). Sollars states the following with regard to the primary operand register files:

> Primary operand register file 22a includes a number of registers for performing the conventional function of storing instruction operands in a new and innovative manner. Preferably, primary operand register file 22a is a scalable uni/multidimensional as well as virtually/physically addressable register file, used for storing integer as well as floating point operands, as disclosed in copending U.S. patent application, application Ser. No. 08/401,411, having common inventorship with the present invention, which is hereby fully incorporated by reference.

Col. 5, lines 22-31. U.S. Patent Application 08/401,411 became U.S. Patent 6,081,880 on June 27, 2000 (hereinafter, "Sollars2"). In that patent, Sollars2, the primary operand register file is referred to as the variable dimensional operand register file (Figure 1) or just, "operand register file" (col. 6, lines 10-32). Sollars2 provides a multidimensional operand register file that is accessible in various modes by the execution units. See the Abstract and col. 6, lines 36-44, for example. Thus, the primary operand register files of Sollars is accessible in multiple ways to the execution units. The primary operand register files of Sollars therefore cannot read on the backing register file set forth in claim 1 because claim 1 specifies that the "backing register file is inaccessible to the at least one execution unit" (lines 9-13). Applicants therefore respectfully submit that claim 1 is not anticipated or made obvious by Sollars.

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For the reasons set forth above, Applicants respectfully submit that claim 1 is not anticipated by Sollars. Furthermore, Applicants submit that claim 1 is allowable over Sollars and the other prior art of record. Since claims 2 and 3 depend from claim 1, Applicants submit that these claims are allowable at least for the same reasons as claim 1. Furthermore, claims 2 and 3 further define and distinguish the invention from the prior art.

With regard to claims 5, 7, 8, 10, and 11, these claims are canceled thereby obviating any rejection thereagainst.

Claim Rejections -- 35 U.S.C. § 103(a)

Claims 3, 9, and 12-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sollars in view of U.S. Patent 5,956,747 to Wilhelm et al., (Wilhelm). Applicants respectfully traverse because not all the claim limitations are taught or suggested by the prior art, or because the claim is canceled.

With regard to claim 3, the Office Action admits that Sollars does not explicitly teach a connection circuit comprising a second connection connected to the main memory from the backing register, but notes that, "Wilhelm has taught a register file (28 of Fig. 2) and a register cache (52 of Fig. 2) operably connected to a main memory (32 of Fig. 2) so that the register values of the register file can be stored in any backing memory (see Col. 5 lines 1-11)" (Office Action, page 10, lines 1-3). Applicants respectfully disagree.

Wilhelm teaches a register file cache for improving the speed of data transfer to and from a large register file. While the register file is in communication with the main memory, this does not read on claim 3 which sets forth "a connection circuit having a first connection and a second connection, where said first connection is operably connected to said backing register file from the at least one register file and said second connection is operably connected to a main memory from the said backing register file" (lines 1-5). Since neither the register file nor the register file cache of Wilhelm read on a backing register file as set forth in depended upon claim 1. Applicants therefore respectfully submit that neither Sollars nor Wilhelm, either singly or in combination, teach or suggest the invention as set forth in claim 3.

With regard to claims 9 and 12-18, Applicants have canceled these claims thereby obviating any rejection against them.

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New Claims

New claims 19-21 depend from claim 1 and therefore should be allowed for at least the reasons mentioned above with respect to claim 1. In addition, new claims 19-21 further define the invention and distinguish it from the prior art.

For the reasons listed above, Applicants respectfully submit that this application is now in condition for allowance and earnestly request the same. Should any issue remain outstanding, Applicants invite the Examiner to contact the undersigned so that any remaining issues can be quickly resolved. Likewise, if the Examiner has any questions or concerns regarding the present Amendment, the Examiner is invited to contact the undersigned at (408) 774-6933.

If any fees are due in connection with filing this amendment, the Commissioner is also authorized to charge Deposit Account No. 50-0805 (Order No. SUNMP298). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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